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ABSTRACT

An overview of Iowa's plan for curriculum improvement in industrial arts, K-12, describes the development, content, and implementation strategies of a new State curriculum guide. Guide development involved two committees made up of teachers, supervisors, educators, and consultants from around the State who reviewed literature, recently developed guides, and professional associational publications. A draft copy of the guide was evaluated by over 50 industrial arts teachers and personnel in Iowa and surrounding States. The final draft is described as providing a framework, rather than specific content and methodology, enabling teachers to innovate their own approaches. Based upon the pyramid concept, the guide emphasizes the goals of career and industrial-technological awareness. A staff development (inservice) systems has been developed but not yet implemented beyond the awareness phase. It contains the following phases: awareness, orientation and dissemination, development and preparation, and trial and adoption. A list of selected references is included. (LH)

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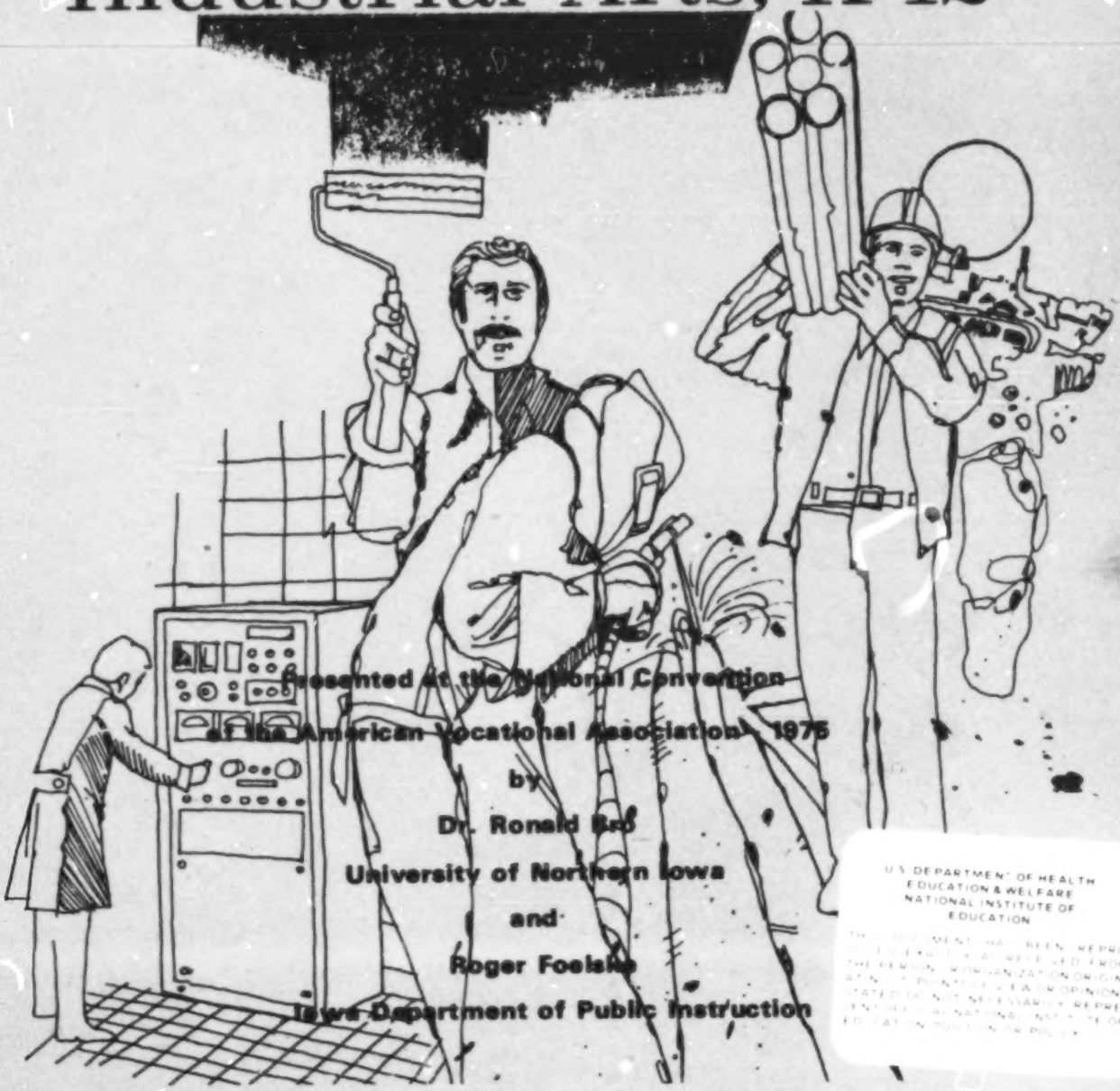
The Iowa Plan for Curriculum Improvement in Industrial Arts, K-12



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of the American Vocational Association, 1975

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THE IOWA PLAN FOR CURRICULUM IMPROVEMENT IN INDUSTRIAL ARTS, K-12

Ronald D. Bro
and
Roger Foelske

In the spring of 1973, the Executive Board of the Iowa Industrial Education Association held a series of meetings with Iowa State Committee on Industrial Arts Teacher Education for the purpose of charting a joint effort to improve industrial arts programs in the state. As a result of these meetings a project proposal was drafted and submitted to the Career Education Division of the State Department of Pubilc Instruction. Essentially the proposal called for development of a new state curriculum guide and an assessment of further needs regarding implementation of the guide. The project was funded and got underway in the fall of 1973. The project was completed in the fall of 1975. The needs identified in the course of the project resulted in additional support of funding from the

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State Department to assist in implementing the major concepts embodied in the guide. A general description of how the guide was developed, its content, and strategies for implementation are presented here.

The Development of the Guide

There were two principle committees involved in the development of the guide--the Project Committee and the Investigative Team.

The Project Committee had the major responsibility for coordinating efforts, compiling information, editing materials, and determining the final format. Its membership represented industrial arts teachers on the elementary, junior high and senior high school levels, as well as industrial arts supervisors, teacher educators, and consultants. The co-directors of the Project Committee were Barry DuVall from Iowa State University and Ronald Bro from the University of Northern Iowa.

The Investigative Team consisted of sixteen industrial arts teachers from the public schools who were presently teaching the types of offerings to be included in the guide. The Team was selected by the Project Committee after the basic rationale, content organizers, and general format had been determined. The Investigative Team was responsible for supplying suggested performance objectives, learning activities, and resource lists for the specified offerings.

All tasks to be performed in developing the guide were identified and scheduled in PERT form. The PERT chart was found to be a valuable instrument for directing the efforts of the task force. Major tasks included review of literature on innovative curricula, recently developed guides from other states, and professional associational publications. Some of the items which were especially helpful are cited in the reference section of this paper. Other functions included consultation with resource personnel associated with innovative approaches to teaching industrial arts.

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The draft copy was mailed to over fifty industrial arts teachers, teacher educators, and industrial personnel in Iowa and surrounding states for evaluation. The feedback from these sources served as a basis for revision and development of the final draft. At this point a technical illustrator was employed to design the layout, make illustrations, and develop the camera ready copy.

Overview of the Guide

The guide is a framework for local curriculum improvement and thus avoids prescribing specific content and methodology. It gives the practicing industrial arts teacher the freedom and flexibility to innovate and develop unique approaches for a particular locale.

The definition of industrial arts in the guide is consistent with federal vocational legislation regarding the eligibility of industrial arts for funding as a exploratory program.

> Industrial arts is that field which provides opportunities for all students from elementary through higher education to develop an understanding about the technical, consumer, occupational, recreational, organizational, managerial, social, historical, and cultural aspects of industry and technology. Furthermore, it is a field wherein students acquire industrial-technical knowledge and competencies through creative and problem-solving learning experiences involving such activities as experimenting, planning, designing, constructing, evaluating, and using tools, machines, materials, and processes. (4-p. 1)

A fundamental premise of the guide is that industrial arts should draw its content from industrial technology. The basis for this premise is that industry and technology are generic terms and are interdisciplinary. To structure an educational program for industrial arts it is necessary to identify the segments of industry and technology which are operationally appropriate for this subject matter field. The operational definition of industrial technology is:

> ...the systematized knowledge derived from the nature, the principles and practices, the products, the services, and energies employed by industry. (6)

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Another basic premise of the guide is that while industry consists of many subsystems, the major (dominant) systems of industry are communications, production, and energy. A model of the content base and its derivation is shown in Figure 1.

The Content Base for Industrial Arts

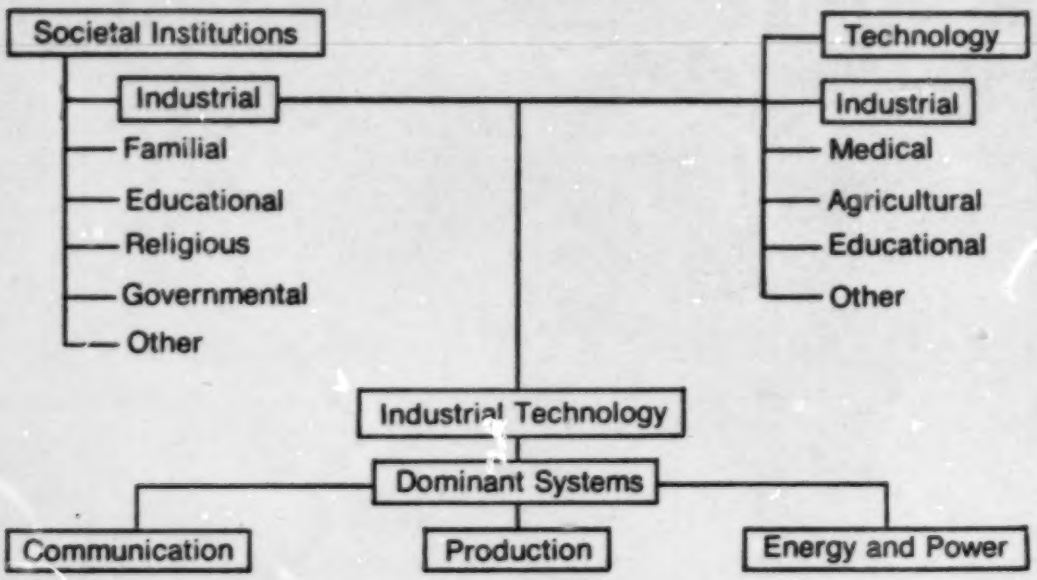

Figure 1

Two general goals were recognized as being appropriate for the entire K-12 industrial arts program. These goals, shown in Figure 2, are inter-related and

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provide unique opportunities for students to learn about industry -- its occupations and associated technologies.

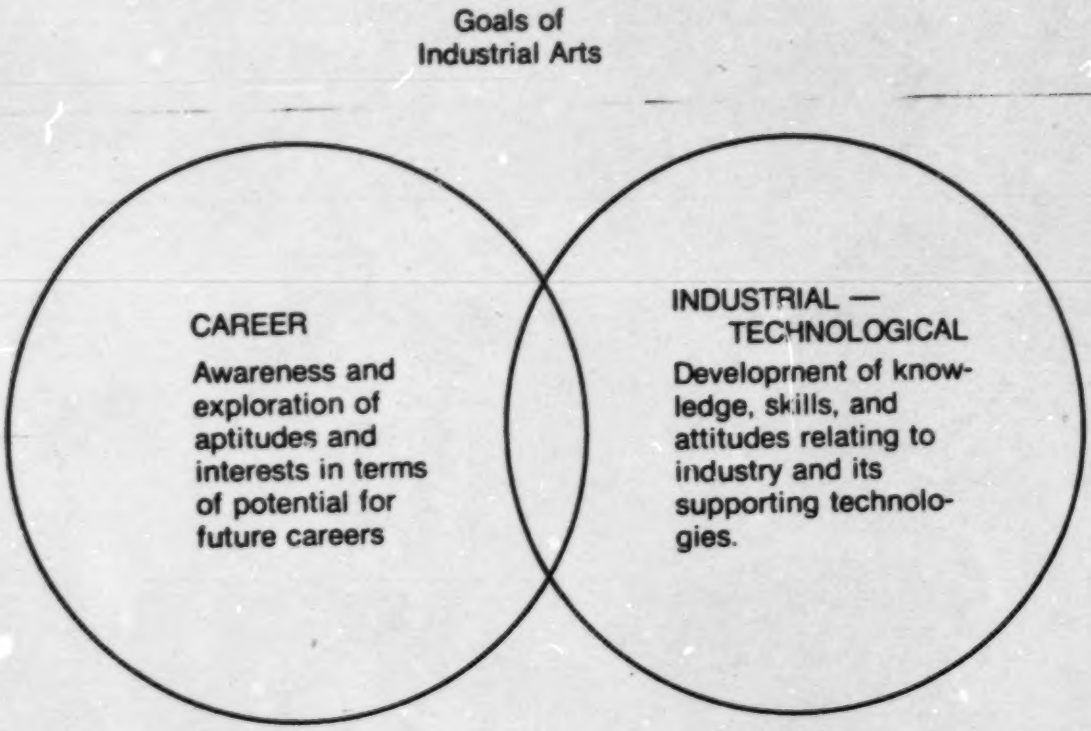
Goals of
Industrial Arts
CAREER
Awareness and exploration of aptitudes and interests in terms of potential for future careers
INDUSTRIAL — TECHNOLOGICAL
Developrnent of knowledge, skills, and attitudes relating to industry and its supporting technologies.

Figure 2

Sub-goals were also identified for the operational levels of elementary, junior high, and senior high. These goals describe the functions of industrial arts at the various grade levels. They are classified under categories of career and industrial-technological. Examples of expected outcomes are presented for each of the operational level goals. For example, an industrial-technological goal on the junior high school level is:

> to develop knowledge of the basic elements of an industrial enterprise.

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An example of an expected outcome for this goal is:

> As a result of learning experiences on the junior high school level, the student will be able to develop a line and staff organizational structure that might be used to staff a student-run industrial enterprise.

The K-12 curriculum is based upon the pyramid concept, beginning with very broad experiences on the elementary level. At the junior and senior high school levels, the planned program narrows in scope consistent with the general maturation levels of students. The concept is depicted in Figure 3. The model depicts the organizational scheme of the curriculum. The program is designed to develop career and industrial-technological awareness, insights, self-concepts, exploration, and some degree of specialization.

The Industrial Arts Pyramid Concept

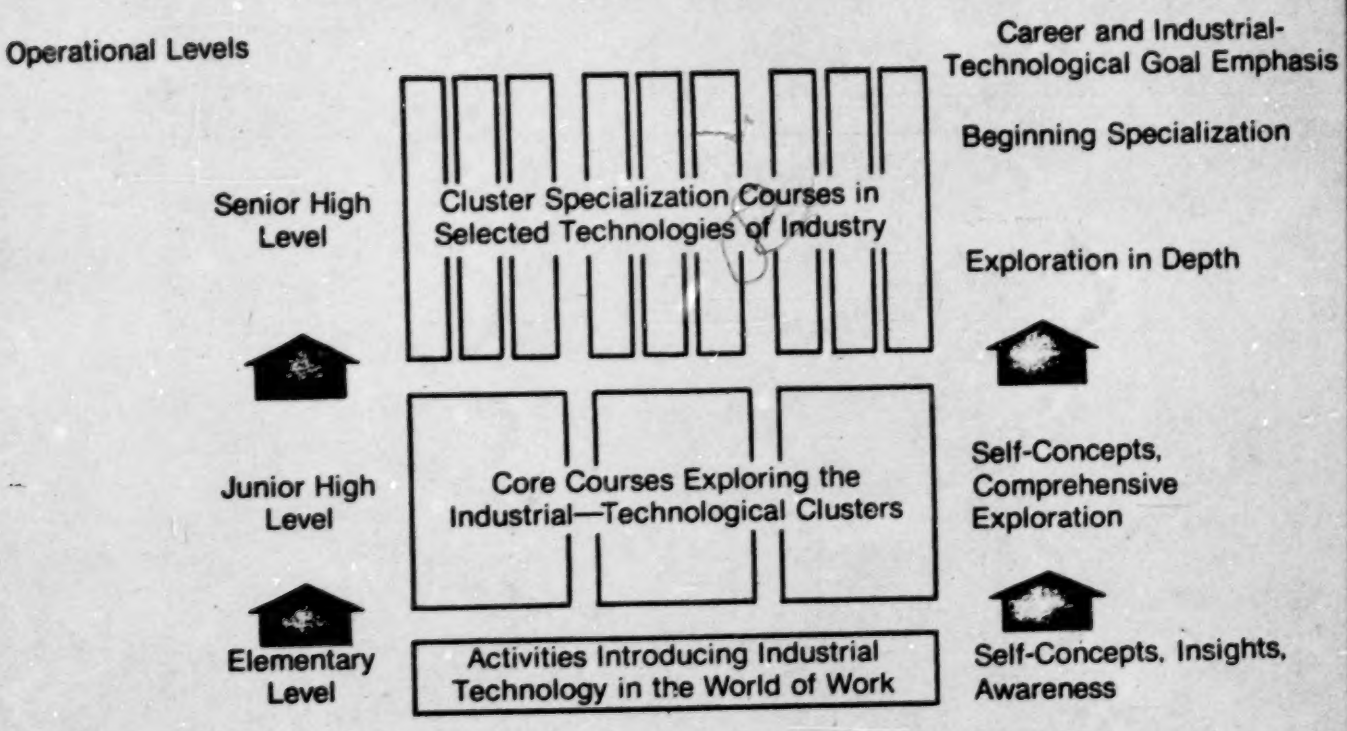
Operational Levels
Career and Industrial-Technological Goal Emphasis
Beginning Specialization
Senior High Level
Cluster Specialization Courses in Selected Technologies of Industry
Exploration in Depth
Junior High Level
Core Courses Exploring the Industrial—Technological Clusters
Self-Concepts, Comprehensive Exploration
Elementary Level
Activities Introducing Industrial Technology in the World of Work
Self-Concepts, Insights, Awareness

Figure 3

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At the elementary level the learning experiences in communication, production, and energy systems are primarily correlated with other subject areas. At the junior high level courses are designed to enable the student to explore specific clusters within the basic systems. There are four cluster exploration courses recommended in the guide. They are graphic communications, manufacturing, construction, and energy and power. At the senior high level, courses pertaining to particular industrial technologies are recommended. The content to be emphasized in these courses includes contemporary industrial materials, processes, organization, and careers. The model of the program which stems from the three industrial-technological systems is shown in Figure 4. The recommended scope and sequence of this program is described in some detail in the guide.

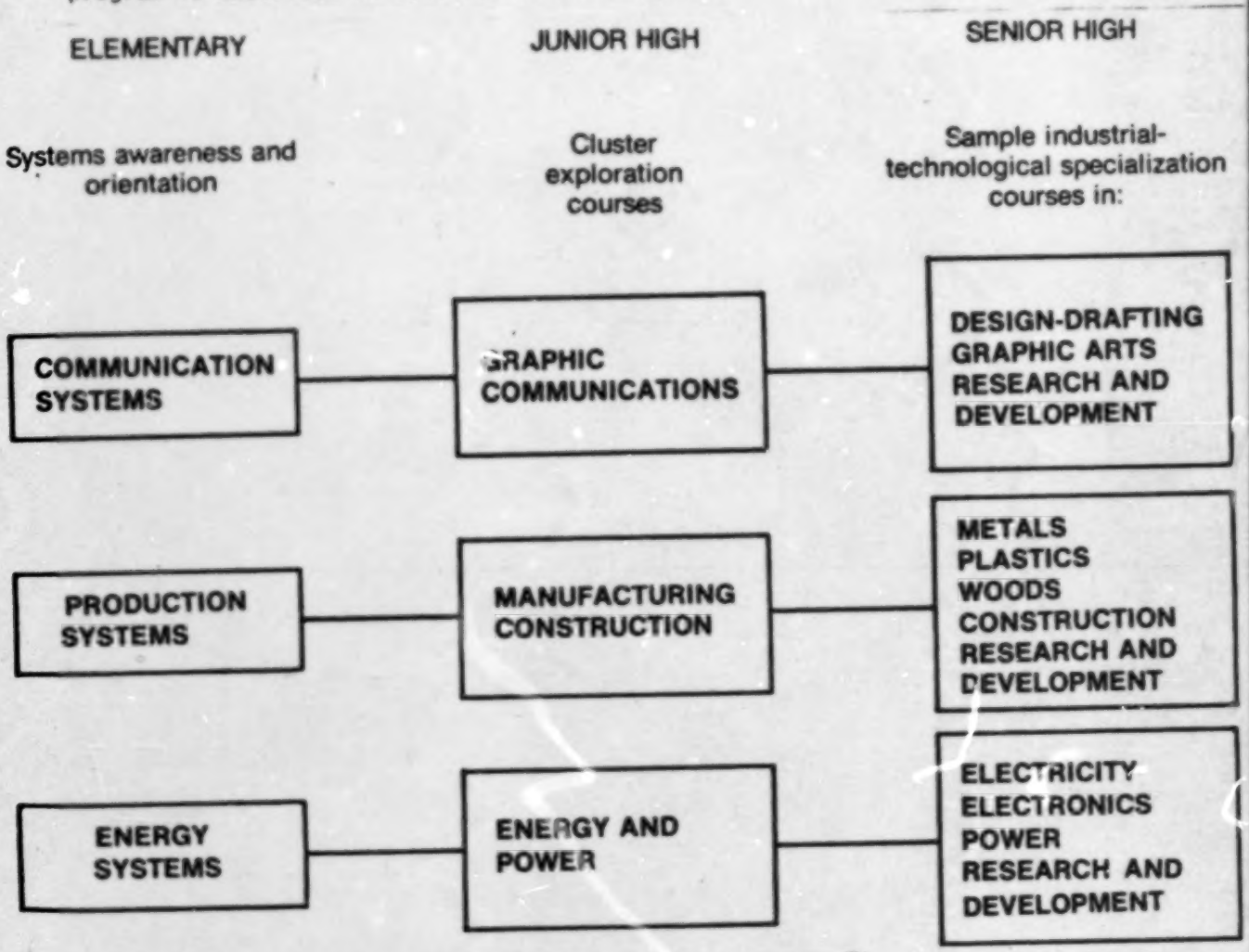

Figure 4

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A major portion of the guide is devoted to selected student competencies and sample learning activities for each of the program offerings. The competencies describe the knowledge, skills, and attitudes which students should be able to exhibit upon completion of the course or offering. The suggested learning activities provide the student with opportunities to practice the kind of behavior implied by the associated competency. The intent was to provide teachers with an idea bank, rather than an exhaustive list of learning activities. The competencies and learning activities are classified under cognitive, psycho-motor, and affective domains.

The guide also contains a description of selected methods and approaches. Those recommended for certain programs in the guide include role playing, the group project, conceptual learning, the enterprise method, the seminar, individualized instruction, and community resources. A fairly extensive list of instructional resources is also provided.

To assist teachers in developing curriculum a model procedure was presented. Four phases of curriculum development are discussed in some detail. Phase I involved establishing a rationale for industrial arts in the total school system. Phase II concerns establishing a basis for the program on a particular operational level. In Phase III the process for developing a scope and sequence of courses is described. The actual preparation of teaching plans and strategies is described in Phase IV. Reference was made to particular sections of the guide which may be of assistance in the various phases of curriculum development.

This completes the overview of The Iowa Guide for Curriculum Improvement in Industrial Arts, K-12. The strategies for implementing the guide are described in the remainder of this article.

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The Development of the Strategy

As stated earlier in this paper, the project proposal called for an assessment of further needs regarding the implementation of curriculum improvement as well as the development of a new state curriculum guide. As a result of the assessment, the Project Committee determined that if the practitioners were to be successful in implementing the concepts and methodology presented in the guide (1) inservice (staff development) should accommodate the dissemination of the guide and (2) the development of additional curriculum material would be necessary.

A series of meetings were held in the summer of 1975, with representatives of the Project Committee, the Iowa State Committee for Industrial Arts Teacher Education, the Iowa Industrial Education Association, and the Department of Public Instruction for purposes of jointly charting a master plan that would meet the needs assessed by the Project Committee to insure that the guide and its concepts would be implemented into local educational programs.

As a result of these meetings, a cadre was appointed and funded to develop and implement a staff development (inservice) system that (1) promoted the concepts of the Industrial Arts Guide and (2) provides assistance to the staff of local educational agencies in incorporating these concepts in the planned educational experiences for students. The Cadre's membership consists of eight industrial arts educators representing junior and senior high school instructors, program supervisors, teacher educators, and area and state curriculum consultants. The co-directors of the cadre are Ronald Bro from the University of Northern Iowa and Roger Foelske from the Iowa State Department of Public Instruction.

Since the guide provided a framework for local curriculum development, and did not prescribe specific course content, and concepts within were by in

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large innovative; it was conceded that change would not occur in a revolutionary manner. The acceptance and implementation of the concepts by local instructors would occur only after they had progressed through the various stages of development. To assist the cadre in constructing a staff development system, a model for implementing curriculum changes was designed after researching various strategies for adopting innovations. Rogers' model in which there are five mental phases that an individual experiences in adopting an innovation was found to be of great assistance. (See Figure 5)

Rogers' Five-Step Process in Adopting Innovation

Awareness-user learnsof existance of the innovation.

Interest-user develops an interest in the innovation.

Evaluation-user makes mental application of the innovation and decides to try it.

Trial-user tries the innovation on a small scale.

Adoption-user tries the innovation on a full scale. (7)

Figure 5

The model developed by the cadre for implementing the Iowa guide and its concepts is a four-phase strategy with evaluation taking place at the conclusion of each phase. (See Figure 6) The individual may bypass certain stages, repeat certain stages, or reject the concept at any stage.

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Iowa Model for Implementing Curricula Change

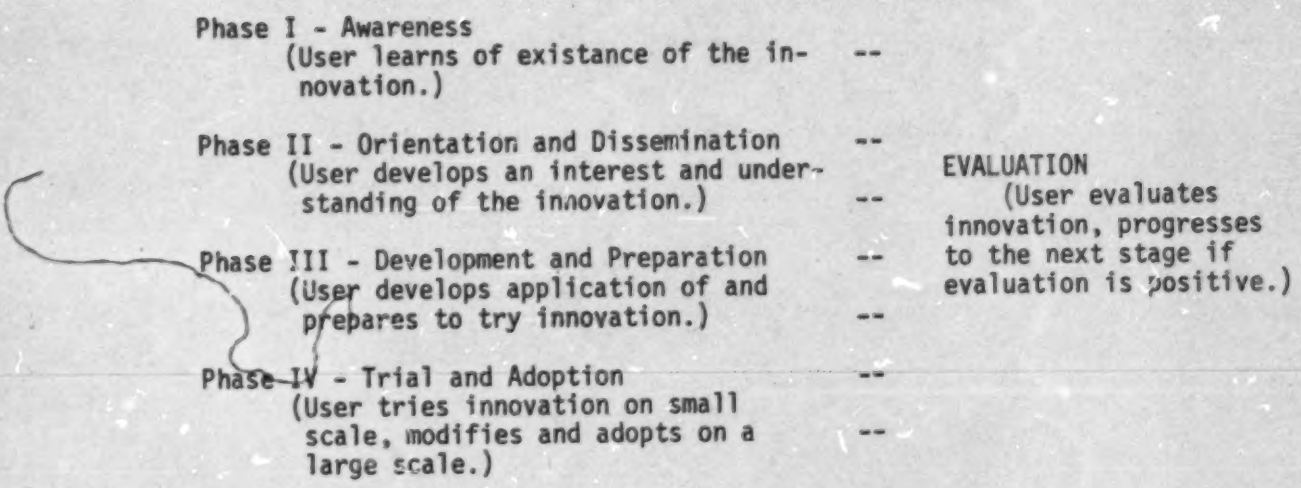
Phase I - Awareness
(User learns of existance of the innovation.)
Phase II - Orientation and Dissemination
(User develops an interest and understanding of the innovation.)
Phase III - Development and Preparation
(User develops application of and prepares to try innovation.)
Phase IV - Trial and Adoption
(User tries innovation on small scale, modifies and adopts on a large scale.)
EVALUATION
(User evaluates innovation, progresses to the next stage if evaluation is positive.)

Figure 6

Overview of the Staff Development System

Phase I - Awareness

The awareness phase of the staff development system was to provide practitioners with an opportunity to learn of the development of the guide, its concepts, and of the new direction being pursued.

This phase was successfully accomplished during the 1974-75 school year, prior to the completion of the guide, through presentations by Project Committee members at four state-wide industrial arts activities. In these presentations, participants were given a brief overview of the status of the development of the guide and an introduction to the major concepts being presented within the guide.

Phase II - Orientation and Dissemination

The orientation and dissemination phase of the staff development system is to provide participants with an understanding of concepts, methodology presented in the guide, and its implications upon local industrial arts curricula. This phase is also to generate interest in curriculum change on the behalf of local practitioners.

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To accomplish this, a multi-media, four-six hour workshop has been developed. This workshop will consist of activities that establish the need for change; presentations providing an analysis of the concepts presented in the guide; a sound slide presentation of possible learning activities; the dissemination of the guide to instructors; and instruction on the use of the guide in local curriculum planning. An overview of future activities being planned to assist in the implementation of the concepts will also be presented.

Since participation of nearly all of Iowa's industrial arts instructors is important in this phase, it was necessary to design a delivery system that would (1) allow flexibility to meet local needs, (2) be geographically located near local educational institutions, and (3) lend itself to a variety of sizes of audiences. The delivery system designed uses a multiplier effect and is conducted through the fifteen Area Educational Agencies (AEA) which divides the state into fifteen geographic areas for the purpose of providing educational services to local schools. (See Figure 7 on the next page.)

This system provides for three levels of activities with each level being responsible for the needs of the level below it. The first level is the state cadre which is responsible for the needs of state, the development of resources to meet these needs, and providing the AEA level with inservice training and resources. The AEA level is composed of 15 teams (one for each AEA) consisting of two industrial arts instructors (presentors) and one AEA consultant (facilitator). The AEA level is responsible for assissing the needs of its area and supplying this information to the cadre level, participating in the cadre training sessions, and planning and conducting inservice activities for local teachers with the area. The third level of system is that of Local Educational Agengies (LEA) teams composed of the school's industrial arts instructors, a guidance counselor, and

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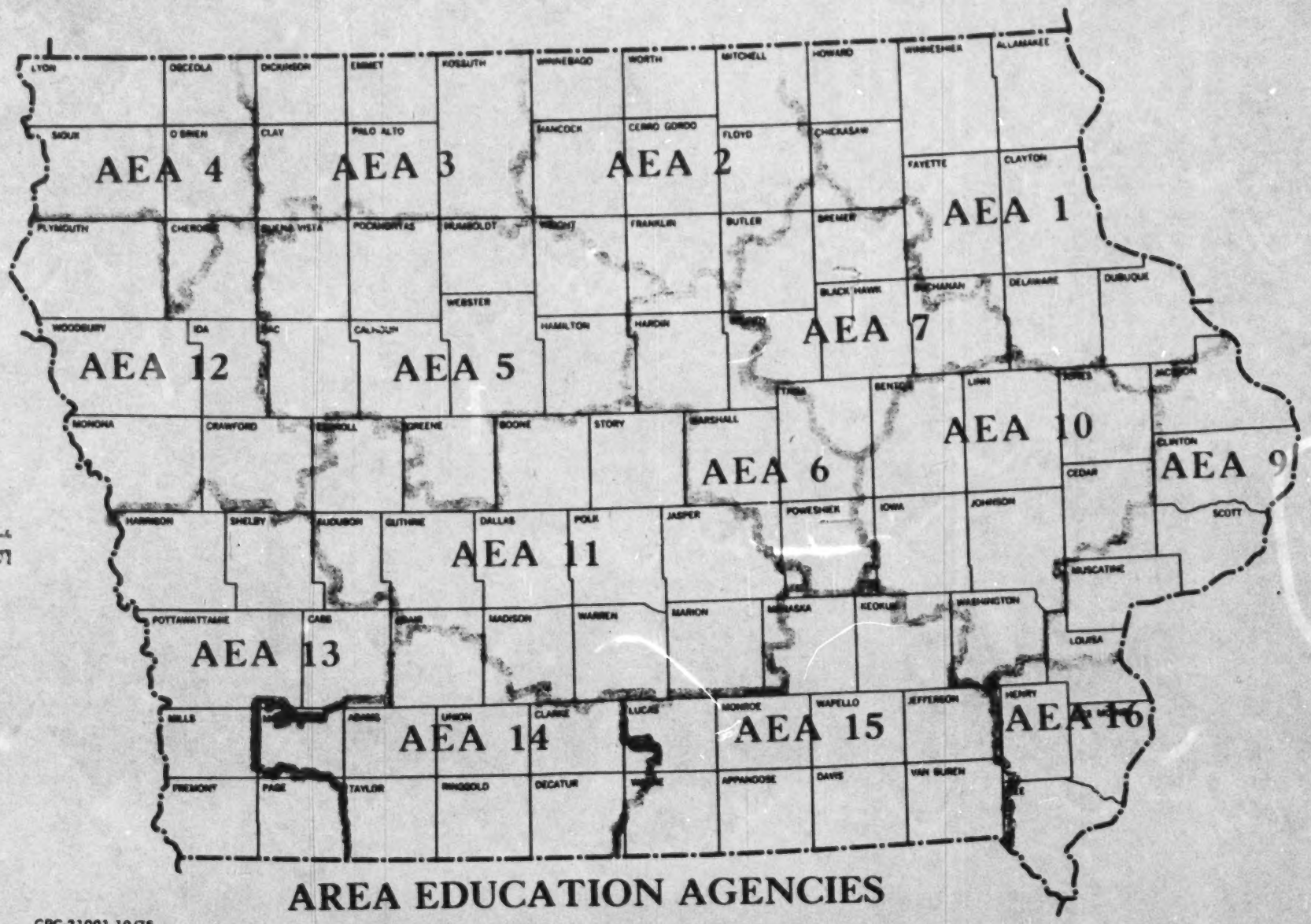

AREA EDUCATION AGENCIES

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Figure 7

an administrator. This team is responsible for the development of a plan as well as implementing local curriculum changes. (See Figure 8)

The Iowa Model for Curriculum Dissemination

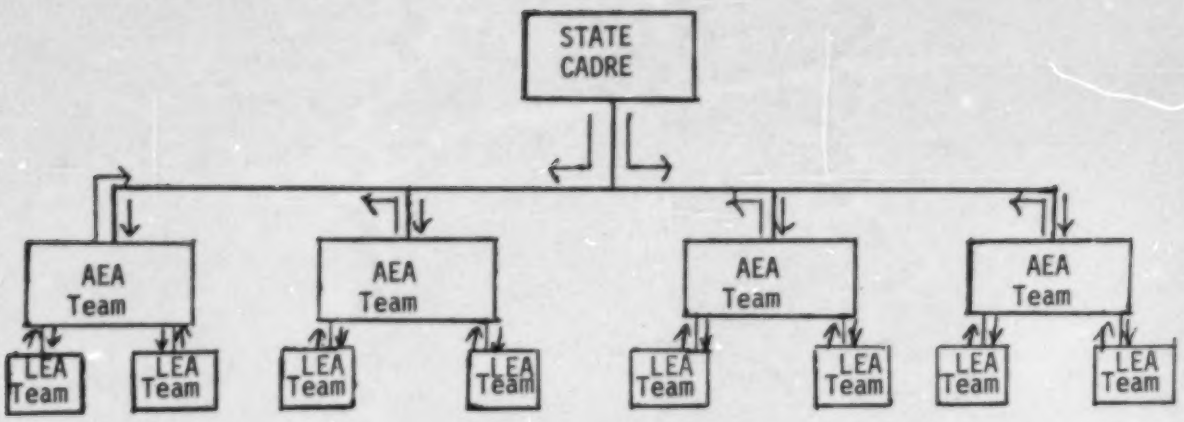

Figure 8

Phase III - Development and Preparation

This phase is one of development of instruction materials and preparation of instructors for the purpose of implementing new educational activities and programs at the local level.

It is proposed that this be accomplished through a variety of activities with four indepth curriculum development workshops as the nucleus of this phase. These workshops would be held in each of the cluster areas (graphic communication, manufacturing, construction, and energy and power) for the purpose of developing

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terminal objectives and teaching materials including learning activities that could be integrated into present curriculum of into new course offerings. Each workshop, ideally, would have participants (local instructors) from each AEA (approximately 20-30 participants). The workshops would consist of two summer sessions separated by a school year. The first session would be devoted to researching and development of instructional materials. The school year would be that of trial, where the activities would be tested in secondary schools. The final summer session would be that of final evaluation, refinement, and publication of the instructional materials.

Also during this phase, workshop participants will work with AEA's in planning and conducting seminars for LEA personnel on topics ranging from writing objectives to specific cluster activities according to local needs.

Phase IV - Trial and Adoption

During this phase, local instructors would first try the concepts on a small scale and then adopt the concepts in their local industrial arts program.

To aid in accomplishing this, model programs will be established for instructors to visit, publications will be available that contain the previously developed learning activities for instructors to use in each cluster area, and consultative assistance will be available to assist instructors as they develop and implement curriculum change.

This completes the overview of Iowa's plan for curriculum improvement in industrial arts, K-12. Further information about any phase of the plan or more details about any of the concepts may be obtained by writing to Ronald Bro or to Roger Foelske.

SELECTED REFERENCES

1. A Guide to Improving in Industrial Arts, American Vocational Association, Washington, D.C., 1968.

2. Career Education: New Perspectives for Industrial Arts, American Vocational Association, Washington, D.C., 1974.

3. Guides on Industrial Arts, (American industry, construction, manufacturing, graphic communications), Department of Education, Tallahassee, Florida, 1973.

4. Guidelines for Industrial Arts in Career Education, American Vocational Association and American Industrial Arts Association Task Force, United States Office of Education, Grant #OE6-0-72-4505.

5. Industrial Education in Minnesota - A Guide for Elementary and Secondary Program Development, Minnesota State Department of Education, 1974.

6. Olson, Delmar W., Industrial Arts and Technology, Prentice-Hall, Englewood Cliffs, New Jersey, 1963.

7. Rogers, Everett M., Diffusion of Innovation, New York, Columbia University Press, 1951.

8. The Conceptual Base for Industrial Education Project, (3 cluster guides), The Kansas State Department of Education, 1974.

9. The Secondary Exploration of Technology Project, (cluster guides on power conversion and transmission systems, industrial communications systems and material analysis and processing systems), School of Technology, Kansas State College, Pittsburg, Kansas, 1974.

10. The Wisconsin Guide to Local Curriculum Improvement in Industrial Education, K-12, Wisconsin State Department of Public Instruction, 1974.

END

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